

REMARKS

Claims 1, 3, and 5-12 are all of the claims currently pending in the application. In view of the following remarks, reconsideration and allowance of claims 1, 3, and 5-12 are respectfully requested.

1. Rejection of Claims 1, 3, and 6-12 Under 35 U.S.C. § 102

Claims 1, 3, and 6-12 have been rejected under 35 U.S.C. § 102 based on U.S. Patent No. 5,946,585 ("Zhang"). For the following reasons, Applicants respectfully traverse the rejection.

First, the Zhang reference specifically teaches that a hydrogen containing region is to be formed via hydrogen ion implantation. (See, e.g., col. 2, lines 55-60). Applicants' claim 1, on the other hand, expressly recites "depositing a hydrogen-containing film on said semiconductor film." This "depositing" step is accomplished, for example, by plasma-enhanced chemical vapor deposition or physical vapor deposition. This "depositing" step is absent from the teachings of Zhang.

Second, the Zhang reference specifically teaches that using thermal processing at a temperature of 300-450° C. This high temperature range is stated as being desirable because it permits one heat treatment to perform multiple processing steps that require this temperature. (See col. 3, lines 6-8). Applicants' claim 1, on the other hand, expressly recites that the "energy density of said pulse energy beam used for heating said hydrogen-containing film [is] set lower than an energy density of [the] pulse energy beam being used to crystallize or re-crystallize said semiconductor." This is significant because Applicants' choice of temperature assures that the semiconductor's substrate is not adversely affected by the temperatures associated with the hydrogen diffusion, even if the substrate it is made, for example, of plastic. As discussed above, this feature is not taught by Zhang.

In addition, the Zhang reference specifically teaches that hydrogen diffusion is performed by heat treatment. (See col. 5, lines 57-67). Applicant's claim 1, on the other hand, recites "irradiating a pulse energy beam to heat said hydrogen-containing film. Applicants' respectfully submit that the

heat treatment taught by Zhang and the energy beam radiation claimed by Applicants are significantly different approaches to heating a hydrogen-containing region. In fact, a pulse energy beam does not appear to be technically combinable with the semiconductor arrangement taught by Zhang's because that semiconductor arrangement has two hydrogen-containing regions, located on opposite sides of the semiconductor.

For the above reasons, Applicants respectfully submit that Zhang does not teach or suggest all of the features of claim 1. Further, with regard to dependent claims 3 and 6-12, Applicants respectfully submit that these claims are patentable over Zhang at least based on their dependency upon claim 1.

2. Rejection of Claim 5 Under 35 U.S.C. § 103

Claim 5 has been rejected under 35 U.S.C. § 103 based on U.S. Patent No. 5,946,585 ("Zhang") and U.S. Patent No. 5,793,461 ("Inou"). Inou has been added for its teaching of plastic substrates. Inou, however, fails to make up the differences discussed above between Zhang and Applicants claimed invention. Accordingly, Applicants respectfully submit that claim 5 is novel and unobvious over Zhang and Inou for at least the reasons discussed above with regard to claims 1, 3, and 6-12.

CONCLUSION

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-3140.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (Three Times Amended) A semiconductor device manufacturing method comprising:
forming a semiconductor film on a substrate;
depositing [forming] a hydrogen-containing film on said semiconductor film; and
irradiating a pulse energy beam to heat said hydrogen-containing film and thereby diffuse
hydrogen in said hydrogen-containing film into said semiconductor layer;
further comprising irradiating another [other] pulse energy beam to crystallize or re-
crystallize said semiconductor film after the step of forming said semiconductor film on said substrate
and before the step of forming said hydrogen-containing film on said semiconductor film, an energy
density of said pulse energy beam used for heating said hydrogen-containing film being set lower than
an energy density of said another [other] pulse energy beam being used to crystallize or re-crystallize
said semiconductor film.